

CLAIMS

What is claimed is:

1. A method for profiling customer behavior in a data processing system having a data warehouse and an OLAP server, the method comprising:
  - retrieving a plurality of records from the data warehouse;
  - generating a customer profile based on the records by utilizing OLAP programming; and
  - generating a customer behavior pattern based on the customer profile by utilizing OLAP programming.
2. A method as in claim 1 wherein said data warehouse has a call table and a profile table, wherein the step of generating a customer profile based on the records further comprises the steps of:
  - retrieving records from the call table and based thereon generating a snapshot cube representing the records, said snapshot cube having predetermined dimensions;
  - retrieving records from the profile table and based thereon generating a profile cube representing the records from the profile table, said profile cube having predetermined dimensions that are the same as the dimensions of the snapshot cube;
  - merging the snapshot cube and the profile cube to generate an updated profile cube; and
  - deriving a customer calling pattern based on the updated profile cube.
3. A method as in claim 2 further comprising:
  - comparing the customer calling pattern with a known fraudulent pattern, if there is a match, then automatically generating an alert.
4. A method as in claim 1 further comprising:
  - analyzing the call pattern cube by utilizing at least one OLAP operation.

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A method as in claim 1 further comprising:  
storing the updated profile cube into the profile table in the data warehouse.

A method as in claim 1 further comprising:  
performing data staging between the profile table and the updated profile cube at  
predetermined time intervals.

A method as in claim 1 wherein said profile cube, snapshot cube, and updated profile cube each includes at least two dimensions and at least two levels.

A method as in claim 8 further comprising:  
analyzing the call pattern cube by utilizing at least one OLAP operation along more than one level.

A method as in claim 8 further comprising:  
analyzing the call pattern cube by utilizing at least one OLAP operation along more than one dimension.

A method as in claim 1 wherein the profile cube, snapshot cube, and the updated profile cube each are multi-level and multi-dimensional cubes.

12. A method as in claim 1 wherein the profile table and the call table each has a plurality of attributes, and the profile cube and snapshot cube each has a plurality of dimensions, said attributes corresponding in a one-to-one fashion to the dimensions.

13. A method as in claim 1 wherein the profile cube includes at least one cell having probability based values.

14. A data processing system comprising:  
a data warehouse for storing data in a relational format, said data warehouse including a profile table and a call table;  
an OLAP server, coupled to the data warehouse, for providing predetermined OLAP operations; and  
a profile engine, coupled to the data warehouse for generating a profile cube from information selected from the profile table, generating a snapshot cube, updating the profile cube by merging the profile cube and the snapshot cube to generate an updated profile cube, and deriving a calling pattern cube based on the updated profile cube.

15. A data processing system as in claim 14 further comprising:  
a fraud detection module for determining whether a reporting tool for use by a data analyst to generate a report having selected parameters based on the calling pattern cube.

16. A data processing system as in claim 14 further comprising:  
an analysis tool for use by a data analyst to compare the calling pattern cube to known fraudulent calling pattern cube.

17. A data processing system as in claim 14 further comprising:  
a visualization tool for use by a data analyst to display the calling pattern cube in different formats, levels, and dimensions.

18. ~~A data processing system as in claim 14 further comprising:  
a data staging tool for transferring data between the profile cube stored in the OLAP  
server and profile table in the data warehouse at predetermined time intervals.~~

19. ~~A data processing system as in claim 14 further comprising:  
an analysis tool for use by a data analyst to extract information from calling pattern cube  
based on selected dimensions, levels, and ad-hoc queries provided by the data  
analyst.~~

20. ~~A method as in claim 1 further comprising:  
utilizing an OLAP server to create profiles, update profiles, derive calling patterns from  
the profiles, analyzing calling patterns, and comparing calling patterns;  
representing profiles and derived patterns as multi-dimensional and multi-level data  
cubes;  
utilizing an OLAP server as a scalable computation engine;  
representing customer profiles as volume cubes; and  
wherein the derived patterns are based on probability distributions, wherein patterns  
covering different intervals can be compared.~~

21. ~~A method for generating customer profiles in a data processing system having a data  
warehouse and an OLAP server, said data warehouse having a call table, said method  
comprising:  
representing customer profiles as profile data cubes;  
deriving pattern cubes from the profile data cubes utilizing OLAP operations; and  
analyzing the pattern cubes utilizing OLAP operations~~

22. ~~The method for generating customer profiles of claim 21 wherein the profile data cubes  
are multi-dimensional and multi-level cubes.~~

23. The method for generating customer profiles of claim 21 further comprising:  
performing data staging at predetermined time intervals; and  
updating the profile data cube by generating a snapshot cube from a call table and  
merging snapshot with profile data cube.

24. The method for generating customer profiles of claim 21 wherein the profile data cube  
has a cell that includes a probability distribution value based on one of the probability  
distribution on calls to each callee and the probability distribution on all calls.

25. The method for generating customer profiles of claim 21 wherein the dimensions include  
a day-of-week hierarchy, a time hierarchy, and a duration hierarchy.

26. The method for generating customer profiles of claim 21 wherein the profile data cube  
represents a plurality of customers, and the pattern cube represents an individual customer.

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